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AMERICAN JOURNAL OF OPTOMETRY

Vol. 15 AUGUST, 1938 No. 8

CONTENTS

CRIGINAL PAPERS

Differential Diagnosis of Iritis. W. R. Cramer 276

A Uniform Procedure in Orthoptics. William Smith 281

A Scientific and Practical Method for Measuring and Fitting Mul ifocal Lenses. M. McFadden 290

Notes on Optometric Educational Training. J. O. Baxter, Sr. 298

EDITORIALS

Advice to the Patient. Carel C. Koch 301

SPECIAL REPORTS

A Survey of the Present Educational and Legal Conditions in the Field of Eye Work. Edwin Forbes Tait 303

Medical Internship Evaluated. George A. MacElree 311

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AMERICAN JOURNAL OF OPTOMETRY

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DIFFERENTIAL DIAGNOSIS OF IRITIS*

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A study of the differential diagnosis of the various diseases of the eye is not only extremely interesting, but a complete understanding of many of the diagnostic features of at least the more common eye diseases is vitally important in practice. One of these prevalent inflammatory diseases of the eye is iritis. Many of the present day authors state that in the majority of cases where there is an inflammation of the iris—iritis, there is also an inflammation of the ciliary body—cyclitis, and thus the condition is one of iridocyclitis. However, be that as it may, for the sake of clarity in the present article, we will confine our discussion exclusively to the condition commonly referred to as iritis.

Generally speaking, iritis is most often confused with conjunctivitis, a condition which like iritis is quite common, and also with keratitis and with acute glaucoma, two conditions which are less common. For a complete description of these various inflammatory conditions, the reader is referred to any of the standard texts on diseases of the eye, for in this article we will confine our discussion exclusively to the differential diagnosis of these conditions.

In the practice of optometry, the importance of being able to positively differentiate iritis and conjunctivitis is obvious. Iritis is a condition which needs immediate and competent medical treatment, and thus it is imperative that it be diagnosed accurately and the case placed under proper treatment as soon as possible. Conjunctivitis, on the other hand, is a condition which very seldom results in serious sequalae, especially if it be of the simple variety. This too, of course, should be given the benefit of proper medical treatment, but in many of the mild cases the use of a simple collyrium of boric acid, which the patient is usually using, will suffice to remedy the condition, if the original cause and other factors manifest in the etiology of the inflammation are also removed. Thus it is that in many cases of simple, mild cases of inflammation, the optometrist is well within his rights to refract the case, for indeed, an error of

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refraction may be the direct or contributory cause of the reaction. However, on the other hand, to refract a case of iritis, would in the majority of cases border on mal-practice. Likewise, it is hardly necessary to mention, that to confound the usually serious condition of acute glaucoma, with either conjunctivitis or iritis, would indeed be a dire diagnostic error. The responsibility of the examiner in the correct diagnosis of these conditions is thus apparent.

One of the first essentials for making a correct differential diagnosis between diseases of the conjunctiva and diseases of the iris, ciliary body and the cornea, is to understand thoroughly the differences between conjunctival injection and ciliary injection. Conjunctival injection, as its name implies, is an injection of the conjunctiva and of course is present in diseases of the conjunctiva. Ciliary injections is present in diseases of the iris, ciliary body and cornea. In the case of conjunctival injection, it is the result of hyperaemia of the posterior conjunctival vessels, while ciliary injection is the result of dilatation of the anterior ciliary vessels from perforating episcleral branches. In the case of conjunctival injection it will be found to be most marked near the fornix and fades as it approaches the cornea. The injection likewise moves with the conjunctiva when pressure is exerted on the lower lid. In ciliary injection the reverse is true. The injection is most marked immediately around the cornea and fades toward the fornix, and it cannot be moved by a movement of the conjunctiva. In conjunctival injection the texture of the vessels is coarse and the color of the injection is a vivid red, while in ciliary injection the texture of the vessels is fine and the color of the injection is pink, violaceous, or lilac.

While a thorough understanding between conjunctival injection and ciliary injection is necessary in the differential diagnosis of conjunctivitis and iritis, other very important diagnostic points must also be mastered. Pain is an important symptom. In iritis the patient usually complains of a brow pain, often worse at night, which of course is a manifestation of irritation of the fifth cranial nerve. In conjunctivitis, however, pain is not characteristic, and instead, the patient complains of irritation of the eyelids, and a hot, gritty, or sandy feeling. The vision in iritis is usually dim, while in conjunctivitis, after the eyeball is cleared of secretion, the vision will be found to be unaffected. A very important diagnostic point of iritis is that the pupil is generally contracted and is very sluggish, or sometimes immobile, while in conjunctivitis the pupil is normal. An examination of the cornea in iritis will, in some cases, show triangular, punctate deposits on the lower half of the posterior surface, the apex of the triangle directed upward, while in the case of conjunctivitis, the cornea is unaffected. In iritis the anterior chamber will show, in complicated cases, that it is deeper, there may be complete annular synechiae, and the aqueous humor may be turbid, while in conjunctivitis it is normal. However, in uncomplicated cases of iritis the anterior chamber may appear normal, so that this point is not of great

diagnostic value except in the complicated varieties. The tension, in iritis is usually normal, but there is as a rule tenderness on pressure over the ciliary region; in conjunctivitis the tension is likewise normal, but the tenderness is usually absent. The iris itself, in iritis, will quite frequently be found to be discolored and the surface may be irregular, while of course in the case of simple conjunctivitis it is unaffected. In iritis there may be lacrimation but there is no discharge, while in conjunctivitis there is usually a mucous of muco-purulent discharge. Age may also help in the diagnosis, for iritis is common before the age of forty, while conjunctivitis may occur at any age. The ophthalmoscopic examination in iritis will show the fundus usually partially or completely obscured, but in conjunctivitis it is unaffected. In addition to these signs and symptoms, it may also be mentioned that in iritis occasionally there may be extreme photophobia, tiring of accommodation, malaise, fever and nausea, while in conjunctivitis these symptoms are uncommon.

Thus it can be seen from the foregoing differential description that iritis presents the more severe clinical picture in most every regard.

Inasmuch as both conjunctivitis and iritis are quite common and thus are seen frequently by every optometrist, it has been deemed advisable to limit our differential diagnosis so far to these two conditions without introducing any points of differentiation between them and keratitis and also acute glaucoma. This, it is believed, will result in a clearer differential picture between the two conditions which are most often met with in general practice. However, it must not be forgotten that there are at least two other conditions that are sometimes confused with conjunctivitis and with iritis. These are, as mentioned before, keratitis and acute glaucoma.

In reference to keratitis it suffices to say that the cornea is characterized essentially by diffuse or localized cloudiness, but is unattended by ciliary tenderness, nocturnal pain, and there are no changes in the iris or pupil, unless the case is complicated with iritis.

In acute glaucoma there is intense headache and radiating pain in the eyeball that may be so severe as to cause nausea and vomiting. The vision varies from dimness to blindness, and the pupil instead of being contracted as in the case of iritis, or normal as in conjunctivitis, is dilated and presents also a greenish reflex. There is a dark red conjunctival injection and the vessels are dilated. The cornea is diminished in sensitiveness and at times reaches complete anesthesia. It will be remembered that in the case of iritis the anterior chamber in uncomplicated cases is unaltered and in complicated cases is somewhat deeper, and in conjunctivitis it is unaffected. However, in acute glaucoma it is usually shallow. A paramount symptom of acute glaucoma is an increase in tension which may vary from a slight increase, to stony hardness. The iris may appear discolored which is due to pressure on the epithelium of the cornea; and, unlike iritis, acute glaucoma is rare before forty. An ophthalmoscopic examination will show, in the majority of the cases, the characteristic cupping of the

disc, which of course is absent in both iritis and conjunctivitis.

To recapitulate, it is apparent that each of the conditions described have characteristic signs and symptoms which should make for a definite diagnosis of the particular case in question. Thus, if a patient complains of brow pain, usually worse at night, the pupil is contracted and sluggish, there is a fine, deep, pericorneal injection which is immovable, and there is lacrimation but no muco-purulent discharge, it is obvious that the case is not one of conjunctivitis, and iritis should be suspected. This, together with other signs and symptoms, which may or may not be present, such as dimness of vision, obscured fundus, and a discolored iris will further substantiate the diagnosis.

On the other hand, if the clinical picture is one in which the patient complains of a sandy, gritty feeling of the eye with no pronounced pain, the pupil appears normal, and there is a diffuse conjunctival engorgement which is most marked at and near the fornix and fades as the cornea is approached, and is movable and superficial, and there is evident a discharge that is muco-purulent in character, it is to be suspected that the condition is one of conjunctivitis, and not one of iritis. This characteristic picture augmented by other definite signs and symptoms such as no change in vision, unaffected and unobscured fundus, a normal appearing iris, will further assure the examiner that the case is one of conjunctivitis, and not iritis.

In the case of acute glaucoma the intense nature of the headache, the dilated pupil, with its characteristic green reflex, the increased tension and the cupping of the disc, together with other manifestations of acute glaucoma that have been previously discussed, should leave no doubt in the mind of the optometrist as to the diagnosis of the case.

While of course it is possible for a case to become complicated and thus be one of both conjunctivitis and iritis, and thus cloud the clinical picture, in such cases it should not be hard to determine whether or not iritis is actually present and if so, treated with the extreme caution as suggested earlier in this article.

From the foregoing it is hoped that it has been made apparent the seriousness of apparently simple appearing outward inflammatory conditions of the eye, and the need for a precise accurate diagnosis. Many a case of so-called "pink-eye" has turned out to be a vicious case of iritis and has resulted in the patient losing a great deal of the function of the eye, and in some cases the eye itself. Frequently, conjunctivitis is mistaken for an elusive foreign body in the eye, and results in continued futile searchs for the offending particle. On the other hand it is not rare that a foreign body in the eye, if not properly removed, or if correct after care is not instituted, results in a corneal ulcer and a resulting iritis with many times a very stormy recovery.

Experiences in the clinic of the Southern College of Optometry

where is received every conceivable kind of pathological condition, have shown the wisdom of giving the students an exhaustive training in ophthalmology. It is quite gratifying to observe that week in and week out, the advanced students in the Clinic definitely differentiate between conjunctivitis, iritis and acute glaucoma, even though many of the cases are quite masked and present innumerable complications.

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A UNIFORM PROCEDURE IN ORTHOPTICS*

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It has been said repeatedly, and by many who should know better, that it is impossible to develop one practical and uniform basic procedure for the training of all types of muscle debility cases by means of orthoptics. That there is no foundation to this assertion is definitely proven by those orthoptists who depend upon skill, and actual knowledge for their results, rather than on gadgets and luck.

There *is* one uniform *basic* procedure for the training of orthoptic cases. If we are to draw an anology, we may compare this basic procedure in orthoptics to the basic procedure in refraction. A basic procedure in orthoptics, as in refraction first of all, depends upon definite scientific principles. In both, optics, physiology and psychology, play important parts. In orthoptics, we may add knowledge of anatomy (and some pathology) of the ocular muscles, their neurology and the various parts of psychology that have direct bearing upon the study of conditioned behaviorism. Thus, attention, association, recollection, and the various attributes which constitute perception, are vitally important to the orthoptist. They form the background for the training which one must have before being able to treat orthoptic cases. In addition, clinical experience is essential, for in that way, can the necessary practical experience be acquired. In ocular refraction, a definite routine is usually followed. Some use a routine consisting of 21 steps, others use routines somewhat different, but the basic outline of any routine is generally the same. It consists of sequences by means of which the various ocular functions are determined. The examination routine is the same, whether the patient has hyperopia, myopia, or astigmatism.

The basic orthoptic routine, therefore, can be a uniform one for all types of muscle debilities. The essential variations consist of the prescribed mode of treatment, much the same as the prescribed variations between hyperopia and myopia, or astigmatism.

There are three types of corrective procedures in orthoptics with but one basic fundamental procedure. Let me make this clear. Supposing we have a case of convergent strabismus, or esophoria. There is quite a

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variation between the two conditions, yet, both are very similar. A strabismus, in reality, is a manifest phoria. In this type of case, the inhibitory force is lacking, causing the weaker muscles to be forced out of alignment. In a phoria, there appears to be rivalry, but never complete inhibition. From the orthoptist's point of view, both conditions require the same mode of treatment. Phorias do not require as complete a program for training as do tropias, but the basic principles are the same. The same holds true of divergent conditions. Whether it is a phoria or a tropia does not matter so much. The program for training is essentially and basically the same in either case. The orthoptist who is seeking singularly different procedures for each case is not a competent orthoptist.

If we are to analyze a case of muscular debility and then carefully determine the shortcomings that we are called upon to correct, we would, by careful analysis and deduction, arrive at a method for correction. Let us analyze such a case hypothetically, and discuss the corrective procedures that are indicated. Assuming the case is one of left convergent strabismus with amblyopia. Vision in the right eye is 20/20: in the left, it is 10/200. The patient has normal retinal correspondence, no evidence of aniseikonia. The fundi, fields, pupils, media, are normal. The refractive correction is negligible. Lenses do not improve vision in the left eye beyond 20/200. The Maddox tangent cross and the perimeter both indicate a 35 degree turn. The indicated method of treatment, therefore, is as follows:

1. Establish visual orientation.
2. Create sensitivity in the affected retina.
3. Teach macular fixation.
4. Teach projection.
5. Correct the amblyopia for near and distance.
6. Establish monocular and binocular perception (fixation).
7. Tend to develop diplopia (superimposition training).
8. Start coordination training.
9. Fusion training (base-in indicated).
10. Duction training.
11. Stereopsis training.

Each step in foregoing outline has a definite part in the development of the case. Those doing strabismus orthoptics know that in cases of low visual acuity, due to amblyopia, the patient very often is lacking simple visual orientation. He is not able to determine the form or outline of objects seen with the amblyopic eye. This should be trained before any other training is commenced. The retina should be sensitized and made ready to receive stimulations. The macular area must be rehabilitated. It seems that the only element to which the optic nerve fibres respond is light. It is therefore light, either in simple form, or in the form of reflected images, that must serve as the media for stimulation. Projection training is indicated because the amblyope, especially with stra-

bismus, has faulty projection. Some call it "false macula," but the manifestation consists of faulty projection nevertheless. This must be trained. Vision should be raised to as high a level as possible. Although coordination does not depend on visual acuity, it is best to raise vision to the highest possible level, thereby giving the patient a better chance for developing normal binocular coordination. The stereopsis level does depend on visual acuity.

It seems that the training of any case by orthoptics depends a great deal upon the conditions discovered during the examination and upon the effects that the orthoptist desires to produce. Many orthoptists consider it training a case of strabismus merely by giving fusion exercises. They pay no attention to the fact which is staring them so obviously in the face that there are other elements requiring attention before fusion. Perhaps it is due to the fact that many orthoptists still regard the macula as a patch or a spot in the retina and nothing more. As a matter of definite fact, the macula is composed of definite optic nerve fibres which extend the entire length of the optic nerve. The fibres of the macular bundle decusate at the chiasm with the other optic nerve fibres. Therefore, if there is amblyopia and faulty projection, and extra-macular fixation, and all the anomalies observed in amblyopia ex-anopsis, it is not merely a defect in the retina and of the macular area, but throughout this bundle of fibres. Training must, therefore, be directed to eliminate macular amblyopia and to establish a clear route of conduction of the visual images. Hence, it is advisable to spend as much time as possible in an effort to eliminate any visual deficiencies prior to training coordination. This accounts for the reason why the greater effort is directed in giving the patient a sound foundation before starting on the secondary training procedures.

Now let us consider another hypothetical case. One of exotropia. The patient, 25 years of age, has a divergent strabismus of about 35 degrees. The amount was ascertained on the Maddox tangent scale and checked on the perimeter. The exotropia has been apparent since infancy and came as a result of some febrile disease. The patient is wearing correction which does not seem to improve vision in the affected eye. The good eye has 20/20 vision with glasses; the poor eye can barely count fingers at one foot away. The eyes are normal. There seems to be no indication of fundus pathology. The patient has normal retinal correspondence. His near point of vision is J1 type with the right eye (the good eye), and large newspaper headline type at about 6 inches with the left eye. Using the Peckham flashing device, it was estimated that the amblyopic eye may be developd to about 20/100 to 20/70 vision by training.

As in the first case, the same problems present themselves. Essentially, both cases are very much alike, excepting that in one case the eye turns in, whereas in the other one, it turns out. The first part of the

program, at least, had to be similar to that used in the first case. Therefore, the program outlined consists of the following steps.

1. Establish visual orientation.
2. Create sensitivity in the affected retina.
3. Teach macular fixation.
4. Teach projection.
5. Correct the amblyopia for near and distance.
6. Determine and correct the accommodation anomalies.
7. Establish monocular and binocular perception to a point of diplopia (fixation).
8. Start coordination training (start with a superimposition training).
9. Fusion training (base-out indicated).
10. Duction training; accommodation training.
11. Stereopsis training.

In this type of case, two added steps in the training procedure may be noticed. In exophorias as in exotropias, there is an under-development of the convergence faculty and with it, the accommodation is usually under-normal. It is imperative in many cases to give accommodation training separately, even before convergence and duction training is started, in order to get the visual functions prepared for the normal tasks confronting them. This, however, is not an iron-clad rule, especially in exophorias. Determination of the cause usually indicates the mode of treatment procedure. If the exophoria is of the exhaustive type, it would hardly do to give accommodation training. In such cases accommodation should be relaxed.

The early part of the training program, however, is the same in both, esotropia and exotropia. The essential part of the program is the elimination of the amblyopia and all its manifestations. Base-out is the basic training procedure, inasmuch as this type of training tends to develop convergence. It may be necessary to start the fusion training by using Base-in effect prior to starting on Base-out. The patient's easiest point of superimposition is the deciding factor on how to commence. But whatever the starting point may be, orthophoria, and after that a high degree of convergence in exotropia (and divergence in esotropia) is the desired result. It is recognized that a ratio of 3::1, or 4::1, is sufficient in divergent strabismus. 3::1 is ample in esotropia.

In an older patient, such as the one in the hypothetical case cited, it is much more difficult to get results. It takes longer and the periods of training must be shorter because of the many disturbing elements. Each procedure, especially those of amblyopia elimination and the training of visual acuity, require longer time and more effort. In younger persons, especially children, the reactions are much more rapid, and the progress much more gratifying for the length of time spent in training. Whether the case is that of esotropia and exotropia, the early part of the training

procedure calls for the same diligence and concentrated effort. The maximum attainment must be made in the first six steps of the training procedure before starting on the second part of the program.

While the esotropias and the exotropias constitute the more common muscular anomalies, there are frequently encountered compound muscular defects, cases in which horizontal defects are complicated with vertical phorias or tropias. Treating anomalies of such types present real problems to the orthoptist, inasmuch as there are two distinct anomalies, with possible two distinct causes.

As in the earlier two cases, the elementary procedure in compound anomalies is no different. The same training of the elementary visual habits must be given. The variation in training commences with coordination training. As soon as the patient is ready to receive monocular and binocular fixation training, an additional step for the vertical alignment of the two images must be instituted. It may be necessary to employ vertical prisms to accomplish this, or it may be accomplished by other means. The importance, however, is that vertical training should be instituted as soon as it is feasible. As the patient's monocular and binocular fixation habits become developed and he is ready for superimposition training, care must be taken to create normal superimposition, both vertically and horizontally. Another hypothetical case is really not necessary to illustrate a method of procedure. To either one of the two cases cited may be given the additional anomaly of hypertropia. The program would have to be arranged so that it would include treatment for this defect at the same time that the horizontal imbalance is being treated. The program would be:

1. Establish visual orientation.
2. Create sensitivity in the affected retinal fibres.
3. Teach macular fixation.
4. Teach projection.
5. Correct the amblyopia for near and distance.
6. Establish monocular and binocular fixation.
7. Teach superimposition, vertical and horizontal.
8. Versions and rotations, with emphasis on vertical.
9. Co-ordination and fusion training—vertical and horizontal.
10. Duction training, vertical and horizontal.
11. Stereopsis training.

Simple hypertropias, although rare, require precisely the same program of training. A vertical imbalance usually has some form of horizontal complication. Besides, it is hardly possible to train vertical muscles independently of the horizontal. It is likewise impossible to send a motor impulse to one eye only, or a stronger innervation to one eye than to the other. This is simple neuro-physiology and we needn't go into that at this time.

The difficulty arises when orthoptic training is attempted in true alternating strabismus. While the program pursued in these types of

cases is similar to that for concomitant strabismus, there are numerous variations to those techniques because of the manifestations which are noted. First of all there is no amblyopia problem, yet there is definite alternating suppression. There is no fixation and projection problem, yet these functions are not normally developed. There is definitely a faulty version and rotation faculty. Diplopia is difficult in being induced. There is no superimposition even with high power prisms. There is usually anomalous retinal correspondence, which may persist in spite of training, indicating possible aniseikonia. There is definite aversion to fusion, and there is rapid alternation. With all these factors, apparent almost at a glance, there is the problem of devising a proper procedure for training. In my experience with alternators, the following program seems to be productive of greatest results:

1. Light stimulation using two retinal flashers of varying speeds.
2. Monocular and binocular fixation training.
3. Simultaneous binocular fixation training.
4. Superimposition training.
5. Version and rotation training.
6. Equalization of binocular perception.
7. General calisthenics using prisms to produce diplopia.
8. Fusion training.
9. Duction training.
10. Alternating suppression training.
11. Stereopsis training.

As may be noticed, the procedure in alternating strabismus contains nearly the same routine with minor variations as do the routines outlined for the other types of cases. Although there is no visual acuity problem to contend with, and although the fixation and projection problems are absent, there is, nevertheless, the problem of rapid alternation and the aversion to binocular fixation and to fusion. It appears when superimposition is attempted, that the right-sided image jumps across to the left and vice-versa. The rapid alternation is involuntary and the patient is not aware of its existence until superimposition is attempted. Simultaneous flashing of the two eyes and monocular, binocular, and simultaneous binocular fixation, tend to resensitize the areas of insensitivity. A new path of conduction may thus be established by which the images may be carried across the visual reflex arc without lapsing. Monocular, binocular, and simultaneous binocular fixation training tends further to stimulate the non-sensitive areas and to intensify the conductivity of the visual images until it becomes fixed and habitual. Superimposition training is the first step in the coordination routine. Version and rotation training tends to develop the refractory ocular muscles and to establish an easy flow of innervation. Equalization of binocular perception tends to create easy simultaneous binocular vision. Calisthenics is a much indicated procedure in alternating strabismus training because of the necessary innervation to the refractory muscles. It is very often necessary

to give prisms for constant use in an effort to create diplopia. As fusion training is started, it is necessary to eliminate any vestige of existing suppression, and for this purpose, training to eliminate alternating suppression must be given. The remainder of the program is as in concomitant strabismus. When prisms are prescribed, either for home wear or for training, it must be borne in mind the purposes for which they are being given. A rule to follow is that the apex of the prism is to be placed in the direction of the desired turn. Strong vertical prisms are often very useful in creating and maintaining diplopia. It is advisable to change their powers and the positions before the eye at frequent intervals.

The routine in phoria training is very much the same as in tropias, excepting that the program need not be so complete. In phoria training, we are mainly concerned with creating proper innervational habits. Base-in training tends to stimulate divergence and to create a relaxation of the convergence muscles. Base-out stimulates the convergence muscles and develops that faculty. In phorias, the various diagnostic findings indicate the procedure, but essentially, the procedures are very much alike. Whatever variations there may be, are in the supplementary training techniques which are necessary in order to develop the correlated functions. For example, not in all cases of exophoria is base-out training indicated. Some cases call for base-in training with relaxation or stimulation of the accommodation as indicated. Likewise, not all cases of esophoria indicate base-in training only. In many cases of apparent muscle imbalances is orthoptic training entirely contra-indicated. Strabismus orthoptics, seemingly the most difficult part of orthoptics, appears to offer greater possibilities, more definite and rational procedures, in all the corrective techniques.

As can be readily seen, the methods and techniques outlined are based upon established factors in psychology of visual perception and all its attributes. The entire routine follows very closely the natural development of normal visual functions and habits. Throughout the procedure, one factor essential to the development of habit is stressed, and that is repetition. The techniques outlined are based entirely upon the supposition that the visual habit functions have not been properly learned, and that wrong visual habits have been developed since infancy, during the time when normal habits should have been developed. Habit, we know, is acquired by constant repetition. It is also known that it is possible to change habits by substituting or learning new ones. Hence, repetition of the various training procedures, until each step becomes fixed thoroughly, is of utmost importance.

I refrained from mentioning instrumentation because I feel, as do many others, that it is the technique and the thoroughness with which a case is understood and handled and the persistence with which the various steps are carried out, that is responsible for the successful outcome. Instruments are essential, but the faith that some men have in gadgets and the belief and expectation that instruments will replace lack of personal

knowledge of orthoptics, is amazing. The procedures outlined can be used with any type of instrument, whether they are an ordinary stereoscope, a phoropter, or some of the most costly pieces of apparatus, or those constructed in the woodshed. Essentially, all orthoptic instruments are based on the principle of stereoscopy. It doesn't really matter what the instrument is, because once a normal foundation is partly or fully established, the remainder of the procedure is rather simple and only depends upon time for its fulfilment. The time element is an important factor in orthoptics. Clinical experience taught me not to hurry a case. Each step should be fully developed until it has reached its maximum point in case of attainment before another step is commenced. The same is repeated until the very end of the program.

A uniform technique in orthoptics is possible, and can be applied to the majority of cases. There are, to be sure, exceptional cases in which the prescribed routine cannot be applied successfully. In such cases, the ingenuity of the orthoptist must come to his rescue. But such cases are rare and are rather the exceptions. Post-operative cases require special investigation and very often call for special programs. Cases of optical nystagmus, concerning which there is hardly any literature, respond rather well to combined orthoptic and refractive treatment. There are other types of case, which, if handled properly, could be made to react most favorably. There are types of cases for which orthoptic training is given promiscuously. If these cases fail to respond, it is not because of faulty technique or inadequate instrumentation, but because orthoptics was not indicated in the first place. I saw a case recently in which base-out training was being given to a woman of 32. The more training she was getting, the more divergent her eyes were becoming. When I saw the case, she had an exotropia in place of the exophoria. The patient, it appears, did not have the benefit of a thorough ophthalmoscopic examination, fields, or a medical examination. The symptoms, both ocular and systemic, indicated a possible paresis. Injudicious prescription of orthoptics is harmful to all concerned. The orthoptist, before advising treatment, should make every effort to determine whether such treatment is indicated and will really benefit the patient. Orthoptics is not just another commodity which may be turned into dollars and cents by clever salesmanship, and by still more impressive looking apparatus. What I am attempting to present here is simple clinical orthoptic procedure, applicable to all types of cases and to any type of apparatus at the practitioner's disposal. My technique is devoid of mysticism, cabalistic figures, synthetic terminology, zodiacal formulae and Greek names. It does not smack of hokus-pokus and will not offend the senses of some who may know something. After all, it must be remembered that as professional men practicing a comparatively new specialty, we must be careful in what we do and what we teach. We have moral duties to those who place their confidence in us and moral obligations to optometry. The tendency on part of some practitioners to overstep the boundaries of their

legitimate callings is apt to cause unpleasant consequences to themselves and is likely to brand the entire practice of optometry. Orthoptics is a psychologically sound system of eye training which deals with the re-education of faulty visual habits. It is not a cure-all. Optometrists practicing orthoptics need most a simple, practical, workable procedure that may be used with the minimum of equipment and at no risk to their patients, reputations and licenses. A competent workman can do a good job with the minimum of effort and with the simplest tools. The most essential requirement in the practice of orthoptics is knowledge. It is the orthoptist whose knowledge is meager that needs gadgets to work for him, think for him and to perform miracles in his name.

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A SCIENTIFIC AND PRACTICAL METHOD FOR MEASURING AND FITTING MULTIFOCAL LENSES*

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In this paper I propose to discuss some of the outstanding points which have a direct bearing upon success in the fitting, satisfaction, utility, and general comfort of both Bifocals and Trifocals.

It is common knowledge that few men have been successful in Trifocal work, while a very large number of Optometrists agree that they are frequently unsuccessful in giving comfort with Bifocals. With our present knowledge of the visual apparatus and the development of modern technique in refraction, analysis, and typing there is little chance of error in the prescribing of proper lens powers either for distance or near work. Our Refractive Science is fully equaled by the lens manufacturer who can today produce for us optical instrumentation of a very higher order.

The problem seems to involve the combination of infinity power and the proximal correction into one lens rather than to burden our patients with two pairs which must be constantly shifted.

We are all creatures of habit, optometrists being no exception. We are improving ourselves along certain lines while standing in a fixed position in other respects. We habitually do things as we have done them for years. It has been our primitive custom to make Bifocals whose segments were as nearly as possible exactly alike in height, for only upon rare occasions does one permit himself to alter the size, position, or conformation of segments.

I have corresponded with and interviewed a very large number of leading optometrists of the Country and have data from many of the largest Opthalmic lens producers which proves that practically all Bifocals are made with segments of even height, that they are equally down-centered and equally in-centered. Now this would be satisfactory if faces were all alike, but they are not, as we are about to consider.

The human body is extremely unsymetrical. It is heavier upon one side than the other. One foot is often larger than its mate by a full size. We wear one shoe out faster than the other. One shoulder is often

*Submitted for publication July 20, 1938.

higher than the other. One arm and hand is stronger. Our spines are seldom perfectly straight, often showing a marked curvature. Our heads are unsymetrical in a number of respects, as illustrated in Figure 1.

We often chew more upon one side than the other, thus developing a stronger jaw and more powerful musculature. The biting line of the teeth is often oblique and the line of the lips frequently slants, sometimes in agreement with the teeth and at other times opposed. The face is generally fuller and the skull wider upon one side than the other, and quite commonly one ear is much the higher, in its postition on the head.

The bronze statue of Evangeline at Grand Pre by one of our most noted sculptors portrays the fact that one side of a person's face may have a cheerful expression, the other side being sad. The boney structure of the crest of the nose, irrespective of its skin covering, is not often central between the eyes, or as we commonly state it one eye is further from the nasal crest than the other.

Thus far we are doubtless all in perfect agreement of the lack of symmetry of the human face.

Most of us are probably well aware that it is necessary to elevate the Phoropter in order to cenrtalize the left eye after having completed work upon the right, or if using a trial frame a similar adjustment is commonly necessary. Nevertheless knowing these facts we have given them little or no consideration whatever.

In our No. 2 Finding with Keratometer we know that it is absolutely essential that the head should be very carefully erected in the face plate of the instrument in order that corneal assymmetry shall not introduce erroneous axis readings. The head must be erect without reference to the position of the outer canthi in conjunction with the markings upon the face rest of the instrument.

All manufacturers are in error in placing such marking, for when there *is* a difference in anatomical eye heights, of let us say 5 mm, if the patient's head is so placed in the face holder of the instrument that the canthi are adjacent to its canthi markings, a head tilt will be introduced amounting to several degrees.

Now the 0-180 degree line is a mathematical water level or base line upon which all engineering factors are predicated, and we cannot fix a false water level line which will vary from patient to patient simply because the left eye of one is higher or lower than the left eye of another.

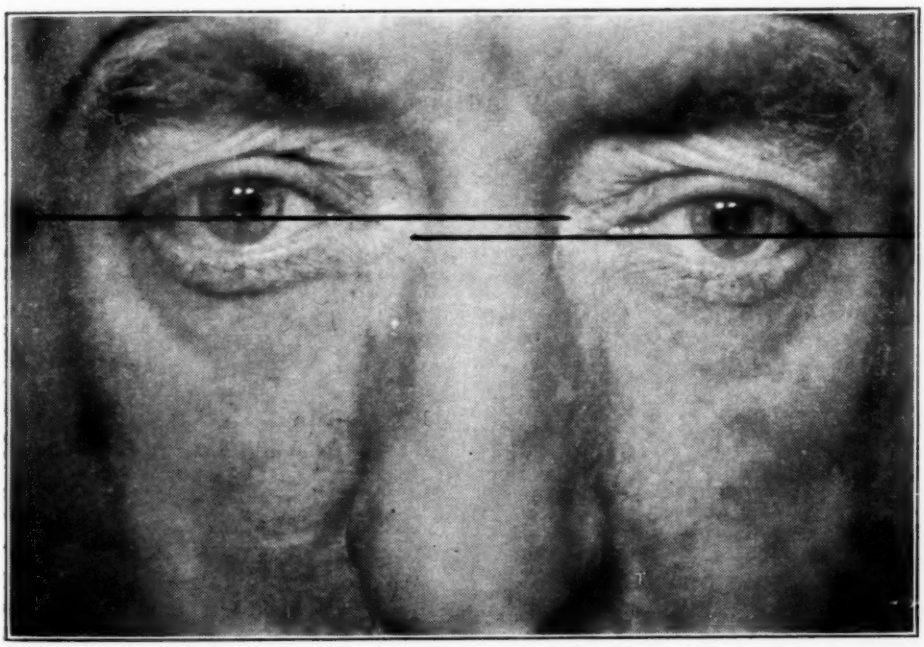
To avoid falling into this common error we must ignore the canthi markings of the instrument and carfeully *erect* the patient's head by turning aside the telescope, reaching across with both hands and carefully erecting the skull, not with reference to brow lines, eye heights, or canthi, but rather by the nasal line, the center of the mouth, or the middle space between the teeth, and the chin line. The head will be erected with great precision by this method, the patient being meanwhile cautioned to press firmly and evenly so as not to alter the adjustment when so placed.

This having been done we proceed with the corneal readings of the right eye, after having carefully centered the apex of the cornea and instructing the patient to look into the very center of the instrument. These readings having been completed in the usual manner the telescope is then directed to the left eye.

Now at this point it is the experience and habit of nearly every optometrist to raise or lower the instrument for centralized fixation *without giving any heed whatever* to the fact that it is changed in position *an amount varying from 1, to 2, 3, 5, 6,* or even more milimeters.

In a dim way we have doubtless sensed these things over a long period of years without considering that such up-centering or down-centering of an eye when placed behind lens powers introduced a condition of false hyperphoria which we will now discuss.

The writer has been engaged in making careful measurements of this factor for a long period of time, and to illustrate this fact a camera was devised which could instantly replace the Keratometer. The photographic plate shown in Figure 1 represents but one of a very large number recorded.

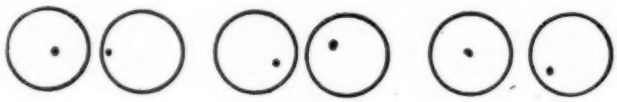


F. McFadden Fig. 1

My statisics quite clearly indicate that out of an average ten presbyopes at least six of them will show a condition of Hyper-Eye, by which I here mean that the visual axis of one eye is above that of its

mate when the head is in a truly vertical position. Now this difference of eye heights varies from 1 mm. to 6, 7, 8, or even more milimeters, one case being 13 milimeters. However a difference of height of the visual axes of 3 and 4 milimeters is exceedingly common, far more common than we imagine.

What would be the effect of up-centering and down-centering a pair of 2.00 diopter lenses a distance of 4 milimeters when under the No. 3 Finding with naked vision there was vertical orthophoria? This factor alone, not to mention that which is of even greater importance soon to follow, would produce a false Hyperphoria of .8 prisopters, certainly sufficient to cause a mark of distress. Figure 2.



F. McFadden Fig. 2

Now following the usual routine proceedure as is attested by Ophthalmic Opticians embracing hundreds of thousands of Bifocal prescriptions from Maine to Florida, California to Miami, Bifocal segments are almost invariably *made exactly alike as to height.*

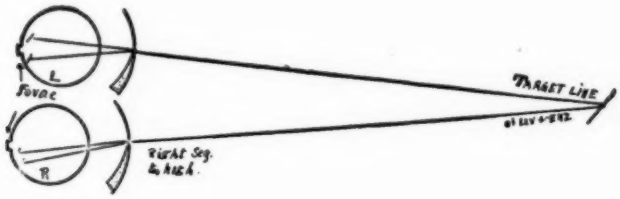
Now data from this same source is to the effect that segments average 2.00 diopters to 2.25 diopters in power, although they vary over a wide latitude. Let us assume that the average Rx with 1.50 diopters power for distance has a 2.25 diopter seg power in each eye.

We will discuss two types of Bifocals, the common Kryptok and the modern Panoptik, Widesite, and other similar types. The Kryptok 22 milimeter segment of 2.25 diopters has a marginal prism of 2.47 prisopter power.

Disregarding the displacement which the main lens may occassion to the visual axes let us give emphasis to the action of Kryptok segment margins. The average wearer of Bifocals, whether of the home keeper, mechanic, clerk, offiice worker, or others undoubtedly changes fixation from far to near and the reverse at least 500 times in a day, and in many instances 5000 times. The visual axes must cross and re-cross these prismatic segment margins at rapid intervals for long or short durations of time. Figure 3.

The irritation engendered by a fluctuating false hyperphoric condition induced by prismatics of segments is of no small or negligable order. Disregarding the prismatic error we may have introduced by false vertical displacement of the main lens, this constant see-sawing of the pairs of the superior-inferior recti, as first one eye and then the other encounters this prismatic power at times and positions which are in constant dis-

agreement as the eyes pass and re-pass between far and near powers, there is no wonder indeed that our otherwise correct and expensively fabricated Bifocals cause great inconvenience and distress.



F. McFadden Fig. 3

Contrast this condition of a usual Bifocal or Trifocal ensemble with that of a properly constructed outfit in which there is a Hyper-Eye status of let us say 4 milimeters. The optical centers of the main lenses were correspondingly up-centered and down-centered, thus doing away with the inherent false Hyperphoria. By the same method if the segments are so placed that their margins are enough different in height so that the visual axes pass from far to near correctly timed, we avoid that fatiguing jump as well as the constant introduction of 2 or more prisopters of power before first one eye and then the other at every change of location.

We are speaking here of the popular Kryptok lens, which we shall always have. In the more modern and improved Panoptik lens the process of manufacture has removed a large portion of the prismatic element from the upper margin of segments. However with all credit due to this improvement nevertheless we know that they do not by any means off-set the difficulty of adopting Bifocals, for if the visual axes of the eyes do not enter and cross misplaced margins in true synchronism the same inherent difficulties continue.

Now there are *two factors,* either one of which, or *both* should be more carefully described. We have spoken of a difference of anatomical heights of eyes, but there is no certainty whatever that the *visual axis* of any eye is in the center of its pupil, for Tscherning has distinctly stated that it is not normally there but 5 degrees nasalward; it may be above center in one eye, below center in the other, even to the very margin of the pupil. It is impossible merely by the usual routine manner of looking at a patient's eyes to guess, imagine, or estimate with any certainty or accuracy whatever where its visual axis lies within the whole area.

Merely to look *at* a patient's eyes and "go by the lower lid" which is a long way from any part of the pupil, is an absurdity. Moreover it is difficult or almost impossible to see the margin of a Kryptok lens, and most certainly it could not be located with reference to an invisible visual axis merely by sitting before a patient.

A quick and convenient way to measure this difference is by the use of the Lev-L-Eye Attachment placed upon the base of the Keratometer.

After the corneal readings of the right eye have been taken the attachment is merely pressed down to indicate zero, and at the same time the telescope of the instrument is directed toward the left eye. Should it be necessary, as it almost invariably is, to either *raise* or *lower* the head of the instrument for centralization we shall find, after making the corneal readings, that the index of the Lev-L-Eye Attachment will show the *exact difference in axis heights.*

We should record upon the record chart any difference in heights as a basis for up-centering and down-centering the lenses. When our measurements show a differece of eye heights of several milimeters the writer of the prescription, as well as the manufacturer of Bifocal or Trifocal lenses, has merely to indicate that the lenses are to be so laid out before cutting and edging that the optical centers and segment margins shall be in accordance with the measurement of difference in height.

When these lenses have been prepared and placed upon the patient's face they should be approximately correct with the exception of such frame fitting and adjustment as is necessary, but none of this work can be left to the slightest degree of chance.

F. McFadden Fig. 4

With the patient seated preferably in the refraction chair where conditions are ideal, the *Lev-L-Enz* is brought into use. Figure 4. By means of this apparatus the patient's left eye is first obscured with the paddle and he is directed to look with his right eye at the *right* target which

is to be slowly raised until its single line *appears as doubled*. This is caused by the segment margin. This slide is moved slowly until both the upper and the lower images appear *equally black*—not sharpness but *blackness*.

The patient is now requested to hold his head immovable and the paddle is transferred to uncover the left eye and to cover the right. The left target is now slowly raised until its line again doubles and its two images also appears *equally black* (without reference to sharpness).

The relative position of the targets is now compared, which of course shows that the segment margin of the left eye is *lower* or *higher* than that of the right. A suitable adjustment of the frame is then made after which this procedure is repeated. It takes one or two adjustments to bring the lines of the Lev-L-Enz targets into synchronism.

When this condition has been brought about, the eyes whether of exactly the same height or with a difference which may amount to 1, 2, 5, or more milimeters, will pass and re-pass their segment margins without the intervention of false prismatics and mistaken displacements of position. They will be in *synchronism*.

We usually place the target of the Lev-L-Enz at approximately 20 inches from the patient's face, and since lenses are about ½ inch from the eyes, the ratio of ½ inch to 20 inches is a 40 times multiplication of any error in setting segment margins, *wherever visual axes may lie* within the pupils.

One of our best known western New York state optometrists, a man with long experience, writes: Quote: "Optometrists with whom I am acquainted confess to a high percentage of failures in bifocal work as high as 60 per cent in some cases, and in fact two well known optometrists of my acquaintance report about 50 per cent of success in the fitting of bifocals."

In my more than forty years of optometric practice I have experienced plenty of this trouble, but since having given strict heed to the differences in eye height, making lenses whether bifocal or trifocal accordingly, as well as carefully synchronising them with the Lev-L-Enz, my difficulties have practically ceased.

It has been my experience for several years that complaints by the wearers of bifocals and trifocals are far more likely to involve lack of synchronisation than all other factors combined.

If perchance, due to our lack of care in the exact placement of the margins of segments of any type, one eye falls within the blur area while the other is outside this blur-area, a disturbance of vision is unavoidable, for the mind is looking through two windows (our two eyes), one of which is in strong contrast or disagreement with the other, and the mind does not know which one to believe.

This consequent antagonism of the visual reflexes reacts upon the convergence triangulation, in combination with the positive and negative

accommodative function, causing those complaints which cost us hard dollars and consequent uncertainty what to do.

If in walking we were obliged to step off 10 inches with one leg and 15 inches with the other we would have a very uncomfortable gait. Suppose we were climbing a flight of stairs whose risers were of an uneven height varying an inch or two. Imagine the stumbles we would make going up or down these stairs. These illustrations are not by any means perfect, but are used to call attention to the stumbling which our eyes constantly encounter when bifocals and trifocals are unsynchronised.

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NOTES ON OPTOMETRIC EDUCATIONAL TRAINING*

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Let us suppose that a dentist was compelled to send his patients to a member of some other profession to administer an anesthetic before he could extract a tooth, treat a case of Vincent's, lance an abscess or make an X-ray for diagnosis. Just how long do you suppose that dentistry would last as a major, independent profession? It would remain only tooth pulling and filling, just where medicine tried to hold it, in the first place.

Let us suppose that Optometry was forced to send its patients to another profession to remove an eye-lash or a cinder, or for an antiseptic that is found in most medicine cabinets. Should this continue, you may be sure that our identity would be maintained only as spec sellers—*just as organized medicine it seems, wishes it to be.* They and their public will then continue to worship at the shrine of the fifty-hour-eye-trained oculist whose identity will also be maintained by them as they read "Eye Doctor," while our four and five year graduates, who need no further description other than that of optometrist, remain in the eyes of the public as opticians and spec sellers, again just as medicine wishes.

The idea of accusing those with enough foresight to prepare themselves for a real Optometry—*as your sons are doing*—of seeking to enter "medicine" through the back door becomes utterly absurd.

No one accuses the dentist of such a thing, for by reason of his superior training his work is not subservient to medicine, even though this training delves deeply into delicate surgery and other essentially medical subjects. His identity as a dentist has been ably expanded and maintained because he has been adequately trained in *all* of the aspects of his work, and he is, of course, permitted to practice what he has been taught.

I am firmly convinced that just so long as we are contented to play a subordinate roll, we will never be given the recognition due us as optometrists even though we are better prepared than are other eye men to supervise work in this field.

Any Optometrist who is unable to carefully diagnose all eye path-

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ology, is potentially a dangerous man (fortunately, there are but few of them left). In order to facilitate an understanding and appreciation of eye-pathology, an understanding of the basic sciences underlying the work is necessary. Those who oppose such training are, to my mind, working against the best interests of the patient, the profession of Optometry and their own reputation in whatever educational or professional field they may occupy.

Picture a patient who is suffering from a serious eye disease passing through the hands of a poorly trained eye man and given a pair of glasses to relieve an asthenopia, when the patient's condition is such that it may destroy his health, his vision, or even his life, all because this specialist was insufficiently trained to diagnose such troubles—and refuses to receive such training, on the ground that his "identity" would be altered. Fortunately, this is not true, as optometrists are trained to diagnose pathology.

The principle argument used by medical men against Optometry is that some optometrists are not fully trained to recognize and treat ocular pathology, and are not, therefore; safe to be trusted with the conservation and safety of vision. I am in perfect agreement with this argument when it is truthfully applied. And let it be said that the casual perusal of a few text books does not constitute training in ocular pathology, since other subjects must be understood before this may be comprehended. I would hesitate to send any patient to one ignorant of eye diseases, and I suspect that most of my readers would be slow to send anyone to an eye-doctor of any school if he was not trained in this respect, and with regard to the association between the eyes and the body as a whole.

To stand in the way of and oppose such vital knowledge when it has such a vital bearing on the safety of the patient's eyes and health—this, I say is a dangerous piece of work that should not be tolerated by the profession, and this regardless of whether or not this knowledge is applied to treatment later on by the profession.

There is no need of concerning ourselves about the future of Optometry. These matters will take care of themselves. In the meantime, let us in reaching for better things, continue to study that which is known to be worth our whiles. Let us learn all we can about the eyes, how they can affect general health and how the ills of the system can affect them. I do not believe that anyone can object to this as a necessary and reasonable procedure for the practitioner who would be of value to his patients.

In the event that all accept this idea as sound, then it naturally follows that it is desirable to obtain this knowledge from the most available source, and when acquired, to use it to the best possible advantage for all concerned.

Adequate four-year courses are available in all of our Optometric colleges, and this in every single detail, including eye surgery and medical treatment of local pathology. We should continue to do all in our power

to encourage these educators who have the foresight to develop our knowledge of the eye and its treatment to the limits. And this will be done in spite of those small but persistent medical objections to thorough and safe training for all optometrists.

Are we, after acquiring all of the knowledge we can, to refuse to use this knowledge in every way we can in the interest of the patient's welfare, out of respect to the medical profession which is *throwing large numbers* of so called specialists trained in fifty hour courses into our field? Shall we refuse to use the knowledge we have gained in our four year courses and continue to send our patients to these fifty-hour pseudo-medical specialists? Watch the younger men and see! Can you imagine for a moment that if the positions were reversed—if Optometry were engaged in sending out large numbers of poorly trained, fifty-hour marvels to practice on the public, without legal qualifications and an unrelenting set-up to see that none were required—can't you imagine the din that would be set up by these medical gentlemen in denouncing such untrained, ignorant quacks? It would reach high heaven, no less.

It is high time that we corrected these abuses. It is time that we acquaint the public, day in and day out, in season and out, with the actual qualifications and professional adequacy of the fifty-hour oculist and six-week eye surgeons who are taking up and practicing Optometry as a side line. What medicine thinks about optometry is of no importance, inasmuch as Optometry is educationally on a sound basis. What we, as optometrists know to be true concerning the quackery in the eye field of medicine must become public knowledge.

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ADVICE TO THE PATIENT

In dealing with the ocular abnormalities of many patients optometrists frequently are confronted with problems which to a greater or less degree are aggravated by the improper visual habits of the patients themselves. The constant use of the eyes in poor or indifferent light, or under such working conditions as to result in the fatiguing effect produced by glare, or by a generally bad posture resulting in holding work too close to the eyes or by bending the head forward thus getting the eyes too near the work, insufficient ventilation and a general indifference to ocular hygiene particularly with reference to using the eyes to excess. These matters are all important to the patient's well being and to the optometrist's ability to give the patient the assistance which should be rendered in these cases so as to give these patients the relief they are seeking.

Elderly patients, particularly are prone to use their eyes to excess. These patients, with many of their former activities considerably curtailed by the natural infirmities of old age, are prone to turn to reading or needlework of various kinds to occupy their leisure time. These patients, at that period of life when the eyes should be used sparingly,

frequently give them the most use they have ever been called upon to do, and as a result the patients suffer from visual fatigue which can be directly traced to excessive use of the eyes at the near point.

To these patients, optometrists must point out that any great amount of reading or sewing requires the expenditure of nervous and physical energy, and any person, be he young or old cannot use his eyes to excess without suffering from some symptoms, unless by chance he is one of those few patients who possesses a very large and over abundant amount of physical stamina. Optometrists see this verified every day as they treat their patients for complaints which developed because of the over use of the eyes particularly at such times when the patient was recovering from a severe illness, pregnancy or general debilitation from any one of a number of causes. In these cases the optometrist applies his knowledge of the system as a whole as well as his knowledge as an eye specialist, and in these cases his advice can do much to correct the improper visual habits into which the patient has fallen.

Another important point which cannot be stressed too strongly in advising the patient as to the future care of his eyes has to do with the use of glasses when these are prescribed for constant wear. If the optometrist is indifferent toward this responsibility, much of the fine scientific refractive work he has done may be of no avail because of the patient's failure to use the correction as much of the time as it should be used. In prescribing glasses for constant wear, the patient must be made to understand that relief of symptoms and the care of the eyes demand such constant use of the glasses and that you as a professional man can only continue to be responsible for his visual care if such cooperation is forthcoming.

Another matter which calls for proper care on the part of the optometrist is that important question having to do with the time which may safely elapse before another examination is required. If this question is answered in an off-hand sort of way by the optometrist the patient will naturally assume that the matter of a second examination is of little consequence and thus much harm may result to the patient. The patient should be told, in specific terms, just when, in the optometrist's judgment, his eyes should again be examined. The advice so given, is, in many cases, of the greatest importance to the patient's welfare and in these cases the patient must be made to fully understand this.

In prescribing a new correction, the optometrist too, should point out to the patient that from several days to a few weeks may be required to become accustomed to the glasses, and that in the case of corrections for astigmia the patient should be sure to have them adjusted at frequent intervals to assure both you as the specialist in charge of the case, and the patient that the prescription you have just written will be most effective. These are small matters, yet all very important to the future success of the work at hand and time should be taken in every case to cover these points, and other similar necessary ones, as the work we are

doing is important enough so as to make the attention to these details imperative. Carel C. Koch.

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SPECIAL REPORTS

A SURVEY OF THE PRESENT EDUCATIONAL AND LEGAL CONDITIONS IN THE FIELD OF EYE WORK*

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During the last few years, it has become increasingly apparent that the present conditions in the fields of both ophthalmology and optometry are not to the satisfaction of that altruistic portion of either group which is chiefly concerned with the welfare of the patient and the efficiency of the members of their respective professions.

In the present survey, the problems of each group will be outlined and their attempts to solve their difficulties set forth and evaluated by comparison with the actual extent of the knowledge and training required to prepare practitioners acceptably for the whole field of eye work.

The field of eye work should be considered as that field which includes all of the procedures which are necessary in correcting or relieving any defect, injury, or disease of the eyes. In other words, the field of eye work includes physiologic optics in its applied form of refraction work; includes the therapeutic measures which one needs to apply in cases of local ocular pathology; and it also includes the surgical procedures which are occasionally necessary. In addition, the ocular practitioner must also have a thorough knowledge of general pathological conditions and their ocular manifestations. Not until a practitioner is thoroughly prepared by the completion of prescribed and adequate courses in all of these fields should he be considered competent to engage in the whole field of eye work.

At the present time, due to this lack of adequate preparation neither ophthalmology nor optometry occupies acceptably any very considerable portion of this field of eye work. The field is apparently wide open for occupancy by any group that arranges its educational and legal affairs in such a way as to provide practitioners trained to occupy it as a result of suitable under-graduate courses.

We shall first consider the medical approach to the problem. For the last ten years the ophthalmological publications have contained many papers and editorials dealing with the conditions which many prominent men in that field have found in their own profession. The consensus of opinion of these men as set forth in these journals is that the majority

*An abridgment of the material written by Dr. Tait appearing in the Alumni and Extra-Mural Bulletin of the Pennsylvania State College of Optometry, January, 1938

of physicians practicing eye work today have a very inadequate background for the work, especially in physiological optics and its immediate application in refraction work, but also in ocular therapeutics and surgery. Many suggestions have been made looking toward an improvement in the situation and many attempts have been made to correct it by encouraging voluntary study and by inculcating in practitioners a desire for further knowledge.

The American Academy of Otology and Ophthalmology is one of the voluntary associations which have attempted to encourage the acquisition of knowledge among the physicians who do eye work, recognizing that there has been a very definite lack of it. Unfortunately, human nature is much the same in all occupations, and we find that only a very few will exert themselves to attain additional knowledge if not forced to it while the others will do nothing because there is no compulsion nor legal necessity. In a large group it is evident that voluntary methods will fail. The presence of professional laws upon the statute books today is evidence that many people would attempt to practice professions without adequate preparation if they were permitted to do so.

Realizing this situation, there has been in the last few years a real attempt to solve the problem by some species of compulsion. The recommendation has been made by a number of prominent ophthalmologists, that an additional period of post-graduate work be required in the case of any physician who wishes to practice ophthalmology. At the end of this period he would, under this requirement, be obliged to pass a special state board which would grant him the license to do eye work.

This proposal, however, has met with considerable opposition, the reasons for which are fairly obvious. If a special group of physicians are specifically licensed to practice one particular specialty, the only way in which the group could be permitted to do work without suffering competition from other physicians who did not have their preparation, would be to prohibit the general medical practitioner from doing anything at all to the eyes. This would mean that the privileges of the general medical practitioner would have to be curtailed. Such a procedure would certainly be against all the traditions of the past and, as a matter of fact, would be quite unfair, for one can readily imagine an emergency in eye work where in the absence of a qualified eye man the presence of a general practitioner would be very helpful due to his acquaintanceship with the general principles of dealing with injuries and accidents.

This question of special license with reference to ophthalmology comes because of a recognition by medical authorities that there are at least two medical specialties which require a very different fundamental training than do the others. Those specialties are dentistry, which is largely a mechanical pursuit and requires four years of practice in mechanical work, none of which is included in the medical course; and ophthalmology which, because of the tremendous preponderance of refraction and muscle problems, requires an adequate knowledge of physiological optics and

its fundamental sciences, none of which are supplied in the general medical course.

Even if the whole field of eye work were considered, refraction, therapeutics, and surgery: the refraction and muscle anomalies would still represent more than ninety per cent of the total eye work, and the therapeutics and surgery would be required only in a small percentage of cases.

The undergraduate medical course gives a fair foundation for the development of ocular therapeutics and surgery, but it does not include the mathematics, optics and mechanical work which are necessary in dealing properly with refraction and muscle anomalies. All other medical specialties, such as surgery, obstetrics, laryngology, rhinology, otology, proctology, dermatology, or any other with the possible exception of psychiatry, are based upon the fundamental work that is given in the undergraduate medical school. Dentistry and eye work are the outstanding exceptions.

An attempt was made some years ago to solve the problem in another way. It occurred to some of those interested in this problem that the fundamental courses in physiological optics and refraction could be given during the premedical years and such a course was offered in an eastern university some years ago.

One of the purposes of this course, as stated in its prospectus, was to take care of prospective medical students who were looking forward to specializing in ophthalmology. The necessity of completing the other premedical work, however, the lack of adequate clinical experience, the fact that anatomy and physiology and physiological chemistry and other fundamental courses were given after the course in physiological optics instead of before made it impossible to offer any effective training in eye work in such a way.

Added to these difficulties was the fact that after graduation from the premedical course the student would spend five years of study in fields that had little connection with that which he had previously done before he was again able to consider eye work. As might have been expected this procedure was a failure, and the institution recently discontinued the course.

The proposal has been made many times that the undergraduate medical course be modified in order to permit elective work in ophthalmology. The American Medical Association, however, has been occupied since 1905 in attaining a uniformity of medical education and when one considers the vast number of subjects which enter into the modern medical course, all of which must be completed in four years, it doesn't surprise one that this proposal is not acceptable to the medical educational authorities. In other words, as has repeatedly been stated by those in charge of medical education, the intensive study of any specialty during the undergraduate course would undo the development towards uniformity which has gone on through the last thirty years. There is therefore no possi-

bility, at least in the near future, that the undergraduate medical courses will be modified in any way in order to permit the adequate study of specialties.

It is unlikely that the present conditions which permit the unprepared physician to engage in the practice of ophthalmology at his pleasure, can long continue, but it is difficult to see how practicing physicians can be forced to take graduate courses or how undergraduate medical education can be modified to meet the need. Even if the latter can be done, it would still be necessary to face the problems of special license. In the interest of the public welfare, however, it is essential that those practitioners who are engaged in such a vitally important field as eye work have their proficiency insured by a suitable required undergraduate course and further attested by the passage of state examinations in their particular field.

From the medical viewpoint, therefore, the peculiar nature of the field of eye work, involving as it does a totally different type of fundamental material from that given in the undergraduate medical course, has resulted in the complete failure of organized medical education to fill the field adequately, and under present conditions there is no possibility of medicine, as medicine supplying adequately trained eye practitioners.

The situation in optometry is even more complex, and to understand properly some of the problems in that profession it may possibly be helpful to consider some facts in its development. Scientific refraction work began with Donders but was carried on almost entirely by the opticians until around 1870. In that year, or around that time, an attempt was made to get physicians actively interested in refraction. For centuries there had been ophthalmologists, who were interested, however, only in the diseases and surgery of the eye, but at no time did any of these early ophthalmologists approve of the use of glasses, in fact they deprecated their use.

The rapidly advancing knowledge of the physiological action of drugs, especially in relationship to cycloplegics and mydriatics suggested that there might be some medical aspect to refraction work, and in Philadelphia, about 1872-1875, the ophthalmologists began to prescribe glasses for refractive errors. The refracting opticians, however, had a monopoly of the apparatus, knowledge and experience required for refraction work, and it was necessary for these new order ophthalmologists to learn their refraction work in the establishments of MacAlister, Queen & Company and others of the refracting opticians.

Somewhat later, the insistence of the ophthalmologists of the Philadelphia group on the use of cycloplegics for refraction began to make refraction work, to some extent, a medical consideration. It should be noted, however, that at that time quite a number of the refracting opticians used cycloplegics freely and they still do so in England. Even after the medical practice acts were passed, some of the refracting opticians continued the use of drugs without being challenged, and ceased the practice only after the optometry acts were put into force.

During this time, however, the refracting opticians, who constituted a considerable majority of those interested in eye work, were developing, perhaps not as rapidly as they would have if they had been able to divorce the commercial aspects of their work from the professional. The necessity for making and selling glasses prevented them from developing rapidly along the line of scientific refraction.

At the beginning of this century, however, there began a very definite movement which started the refracting opticians thinking in professional terms. The result of that movement was the establishment of optometry as a profession and the enactment of laws governing it in all states and possessions of the United States, as well as in Canada, Australia and other countries.

In order to get the protection of these laws and a start toward a real professional development the optometrists, in some states, gave up some privileges which they had formerly enjoyed, including the use of drugs. These had been used, however, in very few instances and probably not at all in the years immediately preceding the passage of the regulating acts. There is still a considerable number of states where the use of drugs is not prohibited by the optometry acts, and where the optometrist presumably can use them if he so desires.

Because of this viewpoint, the optometrist limited himself in his work to non-drug refraction, and, as a result, was moved to develop ways and means of making his procedure more accurate. In order to provide the newer optometrists with the fundamental knowledge necessary to understand these new refractive procedures, it became necessary to increase the content of the optometry courses to a point where they were no longer courses which considered only the mathematical, physical and mechanical aspects of the work. Courses in anatomy, both gross and histological; physiology, general and ocular; chemistry, both general and physiological; psychology; and general and ocular pathology were added to the optometrical curriculum. The content of the optometry courses in certain institutions has been steadily increased to the point where they are fully adequate for the present-day type of practice. Considered, however, in relation to the preparation needed to cover, in a proper way, the field of eye work, the present-day optometry course forms only a part, although a large part, of that necessary preparation. Therefore, as far as the training of the present-day optometrist is concerned, it is insufficient to permit him to attempt to occupy the whole field of eye work.

The real difficulty in the optometrical approach to the question of proper eye service to the public is not in the character or composition of the undergraduate courses as much as it is in the amazing diversity of preparation, ability and viewpoints among those who make up the body of licensed optometrists. In both medicine and optometry there are extremely capable eye men, and it would be quite difficult to say which was the better equipped for the work. These are the groups whose consciousness of their duty to their patients and their own intense interest

in their vocation has driven them to a deep and persistent effort to learn everything possible in their field. These individuals deserve all honor, but unfortunately they are pitiably few in number when compared with the great majority in both professions who care little for additional knowledge or at least do not care sufficiently to make a real effort to become acquainted with the fundamental concepts upon which their work is based.

In discussing the make-up and the viewpoints of the various optometrical groups, it would be well to begin by separating from the main body those few who definitely violate the rather indefinite and somewhat extensible ethical code which seems to be generally adopted by the optometrists as a whole. This relatively small group who advertise prices of glasses, often dishonestly and for the purpose of getting people to come to their establishments, there to be charged as much as the traffic will bear, are cordially detested by the majority group who do not indulge in such practices and therefore consider themselves ethical. For the most part, the objections of the majority group are not based upon the lack of educational preparation which often characterizes the advertiser, or upon the impossibility of doing acceptable refractive work in the time given to it, but are almost always based solely upon the unfair commercial competition which supposedly is the result of the advertising. The critics of the advertiser may themselves be as incapable as he, or perhaps more so, yet for this the majority group rarely has a criticism. On the whole, the advertising group, small in numbers, yet is very vocal and probably obtains more consideration than its numbers warrants.

The non-advertising majority of optometrists, however, present no united front or unanimity of viewpoint. In general they constitute three classes: (1) Those who combine optometry with another occupation, usually jewelry; (2) those who consider refraction work as incidental and necessary in a general optical business, and (3) those who endeavor to conduct their offices in the same manner as the physician and dentist, placing greatest emphasis upon professional work and as little as possible upon the mechanical and commercial aspects.

With rare exceptions, the first two groups, regardless of the amount of work they do, are unable to appreciate or even comprehend the professional spirit which actuates the third group. It appears to them as foolishness, as an impediment to business, for their pride is in the production of a fine pair of glasses, properly made and fitted, rather than in the procedures which enter into the writing of the prescription from which the glasses are made. This pride of workmanship will be recognized as the craft guild attitude and would be an excellent thing if the responsibility of prescribing were removed. Excellency of mechanical work, accuracy of frame fitting, and fair price maintenance, however, in the opinion of the professional group are, while important, quite insufficient for the latter feel that for the most part an absorption in the mechanical details of optical manufacturing is incompatible with the professional viewpoint and good eye work.

The professionally minded group further points out that refraction for glasses is not the only duty enjoined upon the optometrists by the laws under which they function nor is it the extent of their moral obligation to the patient. Theirs is also the duty of recognizing ocular diseases and the ocular manifestations of general diseases and referring such patients to the physician.

In this connection several factors are quite evident to those who are acquainted with the field of eye work. First, these local and general conditions can be detected in most cases, only by the use of the ophthalmoscope or field instruments, which to use properly requires not only considerably more time than is usually given to the whole refraction process but an extensive knowledge of ocular anatomy, histology and pathology, which the majority of the present-day ophthalmologists and optometrists do not possess.

In short, the differentiation of a condition of ocular pathology from a physiological state often involves a reasoning process of an advanced order. It seems evident that a separation of the normal from the abnormal is not the simple process that it is usually considered to be, but involves a considerable knowledge of ocular and general pathology.

While the optometrists as a whole are admittedly lacking in knowledge of this field, the situation in medicine, as has previously been pointed out, is no better when the relatively few competent ophthalmologists are removed from consideration, for the average medical eye man who does eye work solely or as a side line to his general practice, as a rule, has no greater competence in the use of ocular diagnostic instruments than has the optometrist of the corresponding stratum.

Because of an appreciation of these conditions there has been, during the last few years, a constant agitation, principally by certain professionally minded optometrists, for an increase in the educational requirements for entrance to their profession. This coterie of optometrists, which is apparently made up of no small number, is again divided among itself on the advisability of increasing the field and scope of the profession along with the increased educational requirements. While agreed on the necessity of increasing the length of the course in optometry schools and including in the work offered a thorough laboratory training in the so-called basic medical sciences such as anatomy, physiological chemistry, physiology, pathology, the one group believes that this additional work should be devoted to perfecting the optometrical field as it now exists, with no attempt to expand into the field of ocular therapeutics and surgery as a result of the more adequate training.

On the other hand, the second group takes the position that, if additional and advanced work is required in the professional school, the privileges of the practitioner should be increased in proportion as his preparation fits him for such advancement. The proponents of this viewpoint, in discussing the present field, point out that at present the optometrist not only does not have the unquestioned legal right to

recommend simple therapeutic procedures but that he does not even have the right to use all generally accepted methods of refraction work, that with cycloplegics being largely closed to him. In addition, they believe that without the right to use mydriatics, the optometrist, in some cases, can not ascertain certainly whether or not his patient has a fundus pathology, something he is not only legally, but morally bound to do.

The development of such a viewpoint would inevitably result in the occupation of most, if not all, of the eye field by the optometrists, or at least those prepared to carry on such a program, provided the proper educational facilities could be provided, for one extension into the field of ocular therapeutics and surgery, however limited, would inevitably bring others and the process could cease only with complete control of the whole field.

The proponents of the advanced type of course referred to above believe that the graduates of optometry schools should be adequately trained for the whole field of eye work, even though they are limited by legal acts to do only the work of the present-day optometrist. The thought behind this apparently is that, in spite of the legal limitations, the graduates would be more competent by reason of their additional training and, should the demand become more persistent for an adequately trained single group, there would at least be a nucleus of optometrists, properly prepared to do all that is required in the entire field of eye work.

Whether such a development is desirable, or even possible, is something with which the writer is not concerned at present. Certainly the greatest difficulty would be the question of what to do with the great majority of optometrists now in practice. No doubt a considerable percentage could share effectively in such a development of their present field, even some of those who are now conducting more or less commercial businesses. Many of the latter are quite able and well informed but have continued their merchandising methods because of a disbelief in the possibility of the rise of a true professional spirit in optometry because of a consciousness of the difficulty of fostering such a spirit in a group which does not even control or practice all of the accepted methods in its own field.

Some optometrists when discussing these possibilities, emphasize the impossibility of such a program because of the present legal restrictions as they are now written into the State laws. This does not seem a sound viewpoint to the writer, as there is little difficulty encountered in modifying laws if there is an honest reason for the change, as there might be if the optometrists carried out a suitable type of undergraduate professional education.

The possibility of the optometrical group carrying out such a program seems, however, rather remote because of the extreme diversity in preparation and viewpoint among the members. Meanwhile, the public

suffers, for the citizen with ocular trouble has little chance, on the whole, of obtaining competent attention.

It seems to the writer that one of the problems which will soon receive some intelligent attention in this economically changing world will be this matter of providing a suitably trained, State examined, and accredited ocular practitioner to care for the ocular problems of our people. Certainly the rapid advance in applied physiological optics and its underlying sciences will require a training and a viewpoint very different from that obtainable today in either medical or optometrical undergraduate or graduate courses.

It would be relatively easy, however, for one who was well informed in this matter to design an undergraduate course, which would give the student an adequate preparation for the whole field of eye work, without going beyond the time limits which are set by the present-day courses of other professions.

Certainly, it should require no longer time to prepare a student for the field of eye work than it would to fit him for general medical practice. On the other hand, if the preparation were to be adequate, the length of the combined pre-professional and professional course could not be appreciably less than that now legally required for general medicine.

To sum up, there is a vast field of eye work which today is not taken care of adequately by either the medical profession or the optometrical profession, as at present constituted, and which in the interest of the public must be developed and which in time certainly will be occupied by either one of the two groups mentioned or by some other professional group formed to meet the need.

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MEDICAL INTERNSHIP EVALUATED*

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When comparing Medical and Optometric courses of study, physicians are always certain to include one or two years of intern training

*An abridgment of the material written by Dr. MacElree appearing in the Alumni and Extra-Mural Bulletin of the Pennsylvania State College of Optometry, February, 1938.

as part of the medico's educational basis. Optometrists have considered this unfair for several reasons. First: Many medical men have served little or no time in the capacity of an intern, but have immediately entered practice upon their graduation from medical school. Of course, it is true that at present an internship is demanded by most state boards, as one of the essentials of qualification for medical licensure. Our medical friends, however, always fail to mention the fact that this requirement is a very recent development and that it has made its greatest strides within the past decade. Second: Very little of the intern's time is spent on oculuar work, since the authorities in medical education have ruled that Ophthalmology (or any other specialty) shall not be taught in any detail to the undergraduate.

Although either of the above reasons would offer sufficient basis for discounting the greatest portion of the two years internship as far as its value to the eye man is concerned, there is a third reason that is much more powerful than any of the others.

For the last few years organized medicine has realized that all is not well with the intern. In the past year things came to the attention of the general public, when the interns in New York City hospitals made their appearance at a public hearing in favor of accepting payment for their services. This was a startling right-about face to the traditional medical attitude that "Interns can't take money." Many bemoaned the fact that our embryo medicos had lost the vision of their predecessors and had become simply professional business men with one hand on the pulse and the other outstretched for the dollar. This accusation was 1938.
not true, however, as the fault lay with medical system rather than with the intern. It is merely that the intern wanted money because he was not getting the training he had expected and desired some compensation for his service. If the internship had no educational value, at least it should offer some monetary recompense.

In a series of four articles (the fourth of which remains to be published) by Arthur J. Geiger, "Medical Economics" has attempted to delve to the bottom of this problem. This is a most note-worthy effort, since organized medicine seems disinclined to even consider the condition or take any action to end it.

In attempting to be fair and impartial, Mr. (Dr.?) Geiger has obtained information from three sources and presents it in a dispassionate manner. We shall list the three sources below and quote sections from the article in "Medical Economics" under each.

First: Medical Surveys

Among quotations from the reports of various medical surveys in regard to the intern problem there are two that are outstanding in Mr. Geiger's article. We quote—"In a report, 'Physicians and Medical Care,' issued during 1937 by the Russell Sage Foundation, internship was

termed the 'most unsatisfactory and uneven portion of medical education at the present time.' Researchers of the American Foundation, in their survey, 'American Medicine,' published likewise in 1937, came to the same conclusion. 'Internship,' they stated, 'too often becomes rather a year of chaotic and unsupervised experience than a logical continuation of education.' Most of the medical surveys have been unbiased in nature, yet all maintain that many things are wrong with the system under which the intern works. Almost all of them state that if the period of internship is part of the education of the medico, it is education of a very questionable character."

Second: Hospital Authorities

The "Medical Economics" article referring to the magazine "*Hospitals* and *The Modern Hospitals*, presents the attitude of the hospital authorities as follows: "Such authorities as Dr. Borden Veeder, chairman of the medical education committee of the Academy of Pediatrics, St. Louis, Mo., and Dr. W. C. Rappleye, Dean of the Columbia University Medical School, insist that he is a student. Dr. Veeder refers to him specifically as an undergraduate. This view is looked upon with a kindly eye by hospital administrators. When the intern demands an adequate salary for his services, they remind him gently that what he does is all in the spirit of education."

Third: The Intern Speaks

It is in this third section of Mr. Geiger's article that the true value of an intern's training may be evaluated. Questionnaires were sent to interns throughout the United States in order to obtain first-hand information regarding the interns side of the problem. About 80 per cent of the interns replying to this questionnaire stated that they did not believe their job was as much educational as it was drudgery. Some of the quotations cited by Mr. Geiger are as enlightening as they are humorous. We cite below some of these excerpts as offered in the article. Remember they are from the intern himself, regarding the value of his required hospital training.

"Holding retractors six or seven hours a day and running errands all night is fatiguing. But it is not educational . . . "

"Teaching is neglected. Education is confined to laboratory technique and orderly work. Education depends upon what he can pick up."

"Giving intravenous medication is not education. Nor is removing sutures . . ."

"The education factor is nil."

"Being an orderly with an M.D. is not education. Save, perhaps to know better next time . . ."

The quotations above give a fair idea of the value inherent in such training. Some of the terms the interns use to describe themselves are

amusing as well as pathetic. Some of these quoted by Mr. Geiger are: "flunky," "lab-stooge," "glorified orderly," "professional vein-sticker," "hospital bell-boy," etc.

Perhaps the item of greatest interest to the readers of this article lies in Mr. Geiger's statement that "all in all, the intern who responded to the questionnaire was surprisingly sensitive to the flaws of the *educational* system to which he is exposed. The bulk of the replies gave this question more space than any other."

The quotation above will at least give the reader an introduction to the problem of how valuable is an internship to the education of the medico. For more material he may refer to the sources cited.

In conclusion, may we remark that the next time a political medico insists upon including two years of internship as a part of medical education, we should take it cum grano salis.

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"Doctor Do You Use 'Drops'?"

Every day this question is asked in your office by some patient interested in having ocular work done in the best and most satisfactory manner. These patients do not want drops—nor are they against the use of them in refractive work. What they do want is authoritative advice, and then refractive work which is done in the exact way as to give them the greatest possible eye comfort.

The question is asked, not to irritate you, nor to waste your time. It is asked because many thinking people are a little bewildered about the entire cycloplegic question and are today sincerely and honestly seeking reliabe advice.

are YOU able to give them SOUND and CONVINCING ADVICE on this question?

When asked: Do you answer the question in a manner which is both reassuring and convincing to the patient?

YOU WILL FIND THIS MUCH EASIER TO DO

if you use the newly published monograph dealing with this subject, when the matter is brought up by some patient who is sincerely seeking the true facts.

AN INVESTIGATION AS TO THE NEED FOR
"DROPS"
OR CYCLOPLEGICS IN EYE EXAMINATIONS

This new treatise was written and developed to fill just this sort of need. This new monograph covers every phase of this question giving all of the facts and all of the necessary answers, each supported by evidence which will lend conviction to your discussion of the topic.

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